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Frequency of familial short stature in children presented at a Tertiary Care Hospital in Multan, Pakistan.

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ABSTRACT… Objectives: The objective of my study was to determine the frequency of familial short height in children aged 3 to 14 years with short height. **Study Design:** Descriptive study. **Setting:** Department of Pediatric Endocrinology at The Children Hospital & Institute of Child health Multan (CH& ICH). **Period:** November 2018 to October 2019. **Material & Methods:** Eighty four patients were enrolled after taking informed consent from parents/guardians. Heights of all patients, parental heights, mid parental heights were plotted on CDC growth charts. Patients having familial short stature were noted down. **Results:** Out of 84 patients, 59 (70.2%) were males and 25 (29.85%) were females. Age range was 3-14 years. Mean age of the population was 8.68 ± 3.42 years and mean height and weight were 114.29 ± 24.62cm and 28.95±10.01 kg, respectively. Mean height for mother and father of the patients were 154.39 ±4.56cm and 171.10 ± 3.52cm, respectively. Out of 84 children, 21 (25%) patients had FSS. In our study population FSS was more seen in children < 8 years of age, female gender and families with income of > 20K/months with p value of 0.879, 0.129 and 0.592 respectively. **Conclusion:** Majority of children presenting with short stature have FSS and CDG and do not have an endocrine disorder. In our study, frequency of familial short stature in children aged 3 to 14 years was 25%. The results should be validated in multicenter studies.

Key words: Constitutional Delay of Growth, Familial Short Stature, Short Stature.

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INTRODUCTION

Short height is viewed as the most well-known reason being alluded to pediatric endocrinology.[1] The term short height is applied to a kid who is two standard deviations or more beneath the comparing mean tallness for offspring of a similar age, sexual orientation and race. This converted into being beneath the third percentile for the height.[2,3] To characterize a development point; we should quantify the growth parameters in kids precisely and must plot each point (weight, tallness and head perimeter) carefully.[4]

Short height is normally characterized comparative with the hereditary foundation of an individual, is perceived by contrasting a kid's stature and that of a populace of the equivalent hereditary foundation and by utilizing the mid-parental target height. Adult tallness is hereditarily foreordained; normally, 80% of the variety can be clarified by hereditary and environmental components which additionally assume a vital role. Short height is additionally the indication of pathologic conditions or inherited disorders when it results from growth failure or premature closure of the epiphyseal growth plates. In this way, pathophysiology depends upon the basic cause.[5] In addition, looking into the previous growth patterns helps distinguish normal from pathologic variants of short stature.[6]

Genetic short stature or familial short stature is most often a normal variant.[7] In females, Familial Short Stature is the most widely recognized reason for short height. The significant regular reasons for short height in children are constitutional growth delay & and familial short stature.[8] These children for the most part have low-typical height velocity all through life. Their bone age and the chronological age are equivalent, which separates

them from kids with constitutional delay of growth. The molecular basis of a FSS is likewise connected to the same missense mutation in the GH secretagogue receptor.[9]

The objective of my study was to determine the frequency of familial short stature in children aged 3 to 14 years presenting with short stature.

MATERIAL & METHODS

This descriptive cross sectional study was completed in pediatric endocrinology department at The Children hospital & Institute of Child health Multan (CH& ICH) from1st November 2018 to 31st October 2019. A sample size of 84 was calculated using 23% prevalence of FSS as reported by Song KC et al[10], using formula for single proportion with 95% confidence level and 9% margin of error. So, a total of eighty four patients were enrolled after taking informed consent from parents/guardians, according to following criteria: Children with short stature, age 3 to 14 years including both male and female gender. Patients were excluded according to following criteria: Short stature children with known syndromes (Turner, Russell Silver), severe acute malnutrition (defined by weight for height below 3 SD of WHO standards), no consent to participate in the study by patient's guardians.

History and physical examination were performed. Heights of all patients were plotted on CDC growth charts.[11,12] After taking the mother's and father's heights, mid parental height was calculated for all those patients who had short stature on CDC growth charts. Patients having familial short stature were noted down. All information was noted on the specially designed Performa.

All the information was entered using computer software SPSS version 10. Descriptive statistics was applied. Mean and standard deviation was determined for quantitative factors like age, stature and weight of the patients, mother's tallness and fathers' stature. Frequency and percentage were determined for qualitative variables like gender, socioeconomic and familial short height. Effect modifiers like age, sex and financial status were controlled by stratification of information. Chi square test was applied and p value ≤ 0.05 was considered significant.

This study was affirmed by the institutional Ethical committee of the CH & ICH Multan.

RESULTS

Table-I shows descriptive statistics. Age range was 3-14 years. Mean age of the population was 8.68 $\pm$ 3.42 years and mean height and weight were 114.29 $\pm$ 24.62cm and 28.95$\pm$10.01 kg, respectively. Mean height for mother and father of the patients were 154.39 $\pm$4.56cm and 171.10 $\pm$ 3.52cm, respectively.

Table-II shows distribution of population. Out of 84 patients, 59 (70.2%) were males and 25 (29.85%) were females. The distribution of socioeconomic class showed that 28 (33.33%) belonged to families with monthly income less than 20,000 Pkr versus 56 (66.7%) for monthly income of more than 20,000 PKR. Out of 84 children, 21 (25%) patients had FSS.

Table-III shows stratification of data according to age, gender and socioeconomic status (SES). The stratification of age showed that 38 patients had age $\leq$8 years and among these, 12 had FSS. In contrast, 46 patients presented with age $\geq$8 years and among these, 9 had FSS with p value of 0.879. Similarly, gender showed that out of 59 short statured males, 13 were having FSS and out of 25 short statured females, only 9 were having FSS with p valve of 0.129. Socioeconomic status showed that out of 56 belonging to families with income >20/month, 15 had FSS while those with income <20k/month, only 6 had FSS out of total 28 patients with p value of 0.592.

N=84	Age (years)	Weight (Kg)	Height (cm)	Mother's height (cm)	Father's height (cm)
Mean	8.68	28.95	114.29	154.39	171.10
St. deviation	3.42	10.01	24.62	4.56	3.52
Range	3-14	12-44	38.5-143	144.00-160.00	164.00-176.00

Table-I. Descriptive statistics of the population n=84

N=84		Frequency	Percentage
Gender	Male	59.0	70.2%
	Female	25.0	29.85%
SES	>20k/Month	56.0	66.7%
	<20k/Month	28.0	33.3%
FSS	Yes	21.0	25.0%
	No	63.0	75.0%

Table-II. Distribution of the population n=84

N=84		Familial Short Stature		Total	P-Value*
		Yes	No		
Age(years)	<=8	12	26	38	0.898
	>8	9	37	46	
Gender	Male	13	46	59	0.129
	Female	8	17	25	
SES	>20,000/month	15	41	56	0.592
	<20,000/month	6	22	28	
Total		21	63	84	

Table-III. Stratification of data according to age, gender and SES
***Chi-square test of significance**

DISCUSSION

The short stature is one of the most frequent endocrinological entities during childhood and growth is considered the single most important indicator of child's health. The diagnosis of short stature should be clear as many diseases can have an effect on bone metabolism and can lead to misleading clinical features. Non endocrinological causes contribute more than 46%.[13]

The main reasons behind short stature are constitutional growth delay (CGD), FSS, celiac disease, malnutrition and growth hormone deficiency (GHD). CGD is more prevalent in males while females are more likely to get affected by FSS. Waqar Rabbani, M., et al.[14] conducted a study to see the causes of short stature in children. This study had a sample size of 169 as compared to 84 in my study. The common causes of short stature were as follows. FSS 21.3%, hypothyroidism 17.2%, GHD 10.7%, diabetes mellitus 9.5% and CGD 6.5%.[14]

Another study in 2014 showed that both FSS and CGD comprised 55% of all cases with short stature in children with age range of 3 to 15 years.[15] A study by Song, K. C., et al.[10] evaluated the children attending endocrine clinics. They showed that the majority of children had normal height. GHD was the most common pathological cause i.e. 20%. The FSS was identified in 23% of children.[16] Studies from India and Egypt showed features of FSS among short statured children were 15.9% and 42% respectively.[17,18]

The treatment of short stature depends upon its etiology.[19] The FSS should be accepted as such while the malnutrition and hypothyroidism and growth hormone deficiency should be treated accordingly.[20] The genetic factors may not always need investigations as most of the short stature children fall into idiopathic category which doesn't require any treatment.[20]

CONCLUSION

Majority of children presenting with short stature have FSS and CDG and do not have an endocrine disorder. In our study, frequency of familial short stature in children aged 3 to 14 years was 25%. The results should be validated in multicenter studies.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Asia Noreen	Data acquisition, Critical review, Final approval.	
3	Summera Tabasum	Data acquisition, critical review, final approval.	